Contents

<u>Tables</u>

<u>Figures</u>

Section 12

Southeast Colorado River Basin

Utah State Water Plan

Water Quality

12.1 INTRODUCTION

This section of the Southeast Colorado River Basin Plan discusses the water quality along with the state and federal clean water regulations. Emphasis is placed on background and the roles played by local, state and federal agencies involved in the development and enforcement of current water quality regulations. Some discussion of local water quality issues and problems is also included.

12.2 SETTING

Historically, the Southeast Colorado River Basin has been relatively free of major water quality concerns or problems, primarily due to the isolated nature of the smaller streams and the low population densities. This water supply is limited and its quality should be protected. Most of the water quality problems are in the larger Colorado and San Juan rivers.

12.2.1 Surface Water Quality

The surface waters within the basin are generally of suitable chemical quality for agricultural, municipal and industrial uses, although treatment is required for drinking water. The total dissolved-solids (TDS) increase as the water flows downstream because of lower quality groundwater inflow and return flows from irrigation.

The surface water quality is generally adequate for irrigation of crops with the exception of Onion Creek and McElmo Creek. The Dolores River near Cisco has salinity limitations for irrigation of some crops. Although the long-term average salinity in most streams is below state standards, there are periods when total dissolved-solids are high, especially during low flows.

> Pristine water flows from the high mountain watersheds providing a high quality supply to the users downstream. Good water quality is easier to protect than recover.

Onion Creek Spring is fed by groundwater which leaches salts from the Paradox formation. These salts end up in Onion Creek about six miles above its confluence with the Colorado River. A measurement taken in 1966 with a flow of 55 gallons per minute showed the total dissolved-solids were 9,120 mg/L. Although McElmo Creek delivers large concentrations of dissolved-solids (up to 2,600 mg/L) to the San Juan River, irrigation is still practiced downstream where the total dissolved-solids are less than 700 mg/L.[66]

Surface water quality measurements have been taken at locations throughout the basin. The data for selected stations for the period of record are shown in Table 12-1. Location of the water quality monitoring stations are shown on Figure 12-1. The water quality at selected sites is shown on Figure 12-2.

12.2.2 Groundwater Quality

Groundwater is found in two types of aquifers, alluvial deposits and consolidated rocks. The

Table 12-1
SURFACE WATER QUALITY AT SELECTED STATIONS

Stream Gage Number and Name	Electro Conductivity (micromhos/Cm @ 25° C)			Total Dissolved Solids (mg/L)			No. of Samples
	Max	Min	Ave	Max	Min	Ave	EC/TDS
09315000 Green River at Green River	2,520	7	670	2,330	212	464	937/791
09180000 Dolores River near Cisco	15,400	240	1,131	8,220	147	712	1,005/785
09180500 Colorado River near Cisco	14,690	290	924	2,350	197	620	1,547/1,104
09182000 Castle Creek above Diversions	300	140	204				39/0
09183000 Courthouse Wash near Moab	1,200	260	618				54/0
09184000 Mill Creek near Moab	820	110	211				183/0
495646 Pack Creek at U-191 Crossing	545	490	504	350	328	334	2/2
495915 Coyote Wash below Wilcox Trespass Reservoir	5,300	1,140	2,129	3,340	690	1,221	4/4
495890 La Sal Creek at Utah-Colorado State Line	685	185	278	312	108	174	17/17
495600 Kane Canyon Creek - Upper Site	1,000	725	780	620	486	513	2/2
495604 Hatch Wash at mouth	1,110	1,080	1,086	716	658	704	2/2
495581 Cottonwood Creek at Beef Basin Road Crossing	615	484	559	360	282	328	7/7
09185800 Indian Creek Tunnel near Monticello	360	160	211				36/0
09378100 North Creek above Ranger Station near Monticello	410	140	191				12/0
09378170 South Creek above Reservoir near Monticello	300	210	276				8/0
100501350351 Monticello Municipal Watershed				192	88	125	0/4
09378200 Montezuma Creek at Golf Course at Monticello	2,230	170	268				27/0

Table 12-1 SURFACE WATER QUALITY AT SELECTED STATIONS (Continued)

Stream Gage Number and Name	Electro Conductivity (micromhos/cm @ 25° C)			Total Dissolved Solids (mg/L)			No. of Samples
	Max	Min	Ave	Max	Min	Ave	EC/TDS
495236 Dark Canyon above confluence/Colorado River	1,225	85	1,223	768	596	768	2/2
09378600 Montezuma Creek near Bluff (@Montezuma Creek)	3,240	560	1,635				23/0
09378650 Recapture Creek below Johnson Creek near Blanding	390	120	191				32/0
100501250151 Blanding Municipal Watershed				440	110	194	0/8
495344 Recapture Wash at U-262 Crossing	1,807	200	495	1,444	126	365	5/5
09378700 Cottonwood Wash near Blanding	1,050	1	196	230	230	230	80/1
495330 Cottonwood Wash at U-163 Crossing	935	329	536	940	226	541	18/18
09372200 McElmo Creek near Bluff (near Aneth)	3,500	1,410	2,236				32/0
371251109112110 San Juan River above McElmo Creek at Aneth	1,750	1,750	1,750	1,230	1,230	1,230	1/1
09379500 San Juan River near Bluff (near Mexican Hat)	2,310	237	677	1,800	7	490	1,970/1,303
495315 Comb Wash at U-163 Crossing	4,850	610	1,050	2,936	260	458	10/9

Source: U.S. Geological Survey Water Resources Data.

Figure 12-1

WATER QUALITY MONITORING STATIONS

Southeast Colorado River Basin

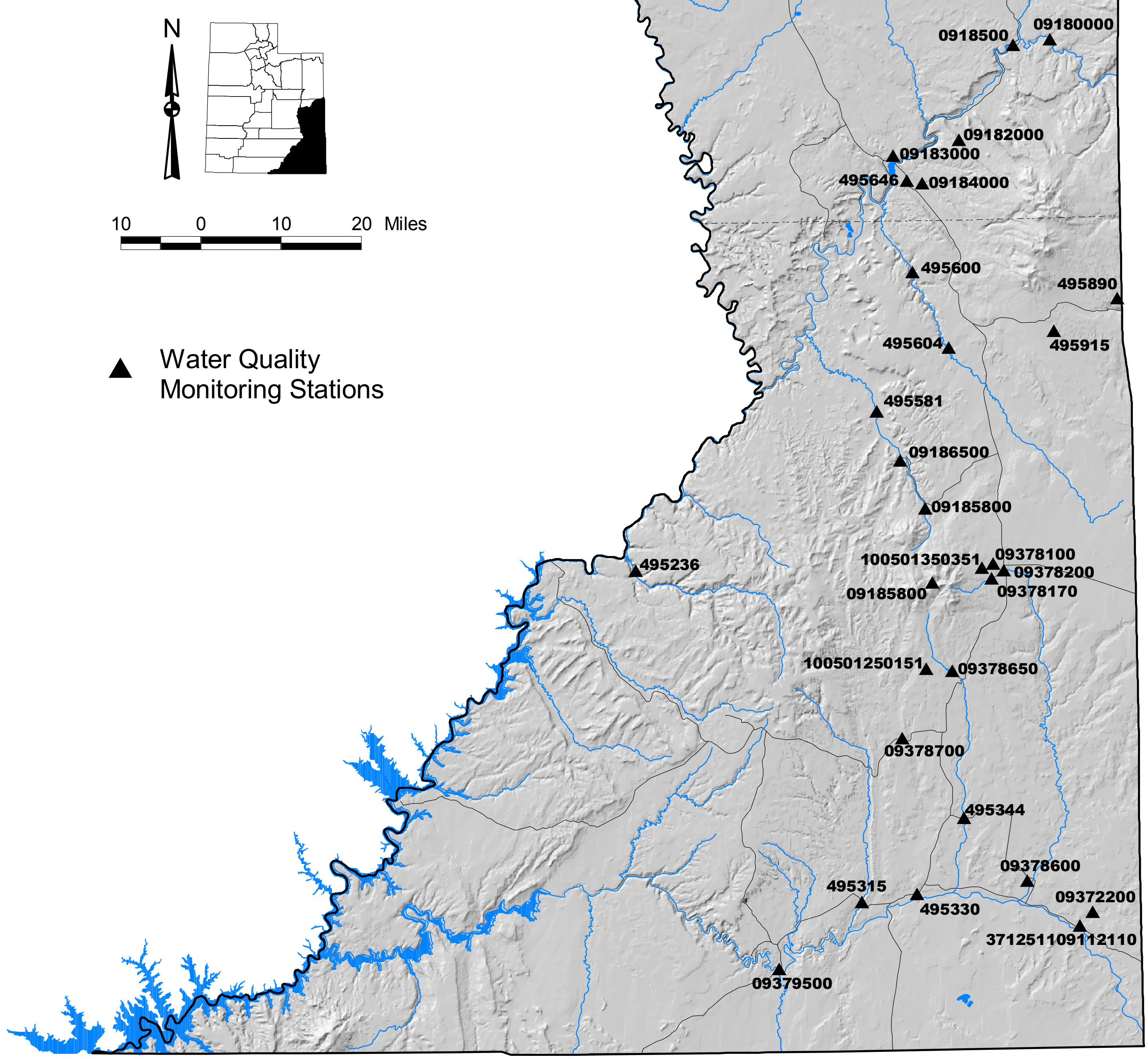
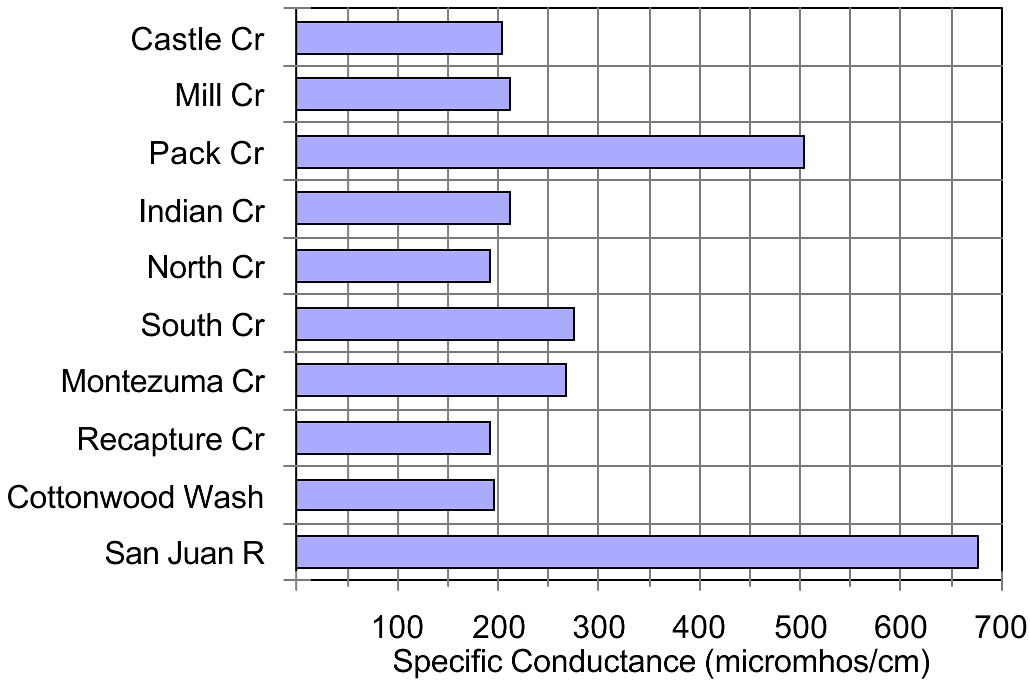


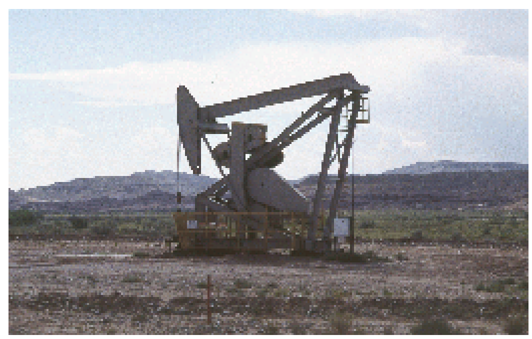
Figure 12-2
SURFACE WATER QUALITY



only significant alluvial aquifers are found in Spanish Valley, Castle Valley and the San Juan River flood plain. Water from these aquifers is of adequate quality to be used for culinary purposes without treatment although there are problems with taste in some locations. All other usable alluvial aquifers are small and isolated.

Consolidated rock formations containing groundwater aquifers underlie most of the area but yields are usually low. The volume and quality of water in consolidated rock aquifers depends upon the permeability, thickness, depth and location.

The most prolific consolidated rock water-bearing formation is the Navajo sandstone, the uppermost member of the Glen Canyon Group. Wells in the Spanish Valley area generally produce water with total dissolved-solids concentrations less than 500 mg/L (848 µmhos/cm) and over two-thirds of these wells with less than 250 mg/L (424 µmhos/cm).[36]



Groundwater contamination from oil wells

Samples taken from the Cutler formation in Castle Valley had total dissolved-solids ranging from 497 mg/L (842 µmhos/cm) to 2,572 mg/L (4,360 µmhos/cm). This aquifer contains calcium-magnesium-sulfate or calcium-magnesium-sodium-sulfate type water.[29,36] Wells sampled in the alluvial aquifer ranged from 211 mg/L (357 µmhos/cm) to 1,156 mg/L (1,960 µmhos/cm).

The Navajo sandstone is also the best water yielding formation in the **N aquifer** designation used in San Juan County (See Section 19). The Navajo sandstone is recharged from the Book Cliffs, La Sal Mountains, along the flanks of the Abajo Mountains, Sleeping Ute Mountain and the Carrizo Mountains.

Water in the recharge areas is fresh and mostly of calcium-bicarbonate or calcium-magnesium-bicarbonate types. As the water moves deeper and to more distant areas, the total dissolved-solids increase. Most of the bedrock aquifers yield water that is fresh (0 to 1,000 mg/L) to moderately saline (3,000 to 10,000 mg/L). The **D aquifer** contains fresh water except in areas where the recharge comes from areas underlain by the Mancos shale or its sediments. The **M aquifer** contains fresh water but the salinity increases with distance from surface recharge areas. Water in the **N aquifer** is fresh to moderately saline except near Aneth where it is very saline (10,000 to 35,000 mg/L) to briny (more than 35,000 mg/L). This aquifer is at its greatest depth in this area. The **P aquifer** water increases from 1,000 mg/L north of Monticello to more than 10,000 mg/L deeper and farther away. See Figure 3-5 and Section 19 for a description and additional data on these aquifers. Wells and springs have been sampled at many locations, at various depths and with many geologic sources. Data from selected samples are shown in Table 12-2.

12.3 ORGANIZATIONS AND REGULATIONS

Water quality is important to all users. Leadership in improving and maintaining water quality rests with local governments along with assistance from state and federal regulatory agencies.

12.3.1 Local

City, town and county units of government have the responsibility to follow and enforce state and federal laws and regulations in operation of their facilities. They take an active role in protecting wells, springs, and recharge areas, and in treating culinary and waste water. The Southeastern Utah District Public Health is also involved in water quality matters, checking waste treatment facilities such as septic tanks, lagoons and waste water treatment plants.

12.3.2 State

Utah has long been aware of the importance of maintaining adequate levels of surface and groundwater quality. With the passage of the Utah Water Pollution Control Act of 1953 (UWPCA), the present Water Quality Board came into being and was given a number of responsibilities including the power to adopt, enforce and administer regulations designed to protect the state's water quality. The Division of Water Quality (DWQ) assists the board in this responsibility. This includes enforcement of the Utah Water Quality Act and the federal Clean Water Act. The board and division are charged to maintain acceptable levels of water quality for a growing population. Increasing numbers of people also bring more recreational activity with added potential for pollution of surface streams and reservoirs as well as groundwater. This will require water quality agencies and water rights administrators to correlate their activities to assure state surface water and groundwater standards are met.

The Clean Water Act gives responsibility to the Department of Environmental Quality (DEQ) for the enforcement of regulations dealing with point and nonpoint source discharges. The DWQ is responsible for administration of the National Pollutant Discharge Elimination System (NPDES) and the Nonpoint Source (NPS) Program. The agricultural portion of the NPS program is carried out by the Utah Department of Agriculture and Food under contract with DEQ. Municipal wastewater treatment facilities and

Table 12-2
GROUNDWATER QUALITY AT SELECTED WELLS AND SPRINGS

Location	Geologic Source	Date	Specific Conductance (μS/cm)
(D-25-23)17 Castle Valley near Placer Creek	Cutler formation	12-95	2,900
(D-25-23)7 Castle Valley nr confluence Placer & Castle Creeks	Alluvium	12-95	300
(D-23-21)27 Arches National Park	Wingate sandstone	8-86	515
(D-26-22)15 Moab, 2 miles Southeast between Mill & Pack Creeks	Glen Canyon Group	8-85	360
(D-39-24)13 Hatch Trading Post	Bluff sandstone	8-60	598
(D-29-23)4 Near La Sal Junction	Navajo sandstone	1-64	760
(D-31-23)32 Near Church Rock (junction of US-191 & SR 211)	Navajo sandstone	4-83	305
(D-34-23)1 Montezuma Creek, 1 mile South of Monticello	Dakota sandstone	4-54	880
(D-36-22)26 East side of Blanding	Burro Canyon formation	3-83	510
(D-38-22)23 White Mesa Community	San Rafael Group	5-80	360
(D-39-24)13 Hatch Trading Post	Bluff sandstone	8-60	598
(D-40-21)25 Bluff	San Rafael Group	11-82	560
(D-41-25)17 Aneth	Navajo sandstone	10-64	11,100
(D-41-25)4 Aneth, 3 miles North	Glen Canyon Group	4-83	4,890
(D-40-24)17 Montezuma Creek, 3 miles North	San Rafael Group	9-54	3,990
(D-40-24)20 Montezuma Creek, 3 miles North (spring)	Morrison formation	9-54	867
(D-41-24)31 Montezuma Creek, 6-1/2 miles South-Southwest	Recapture member-Morrison fm	10-54	1,030
(D-43-23)32 Montezuma Creek, 15 miles South (spring)	Wingate sandstone	8-49	662
(D-42-22)29 Bluff, 15 miles South (spring)	Navajo sandstone	10-54	384
(D-42-19)7 Mexican Hat	Cutler-Halgaito Tongue member	4-56	1,190

Note: All sites are wells unless otherwise noted.

Moab waste water treatment plant

industries discharging pollutants into Utah waters are issued a Utah Pollutant Discharge Elimination System permit. These permits are valid for five years. Since the initial passage of the Utah Water Pollution Control Act, nine wastewater treatment facilities have been constructed in the basin. These facilities include one plant employing mechanical secondary treatment and eight plants employing lagoon systems. A summary of these plants and their respective treatment processes is given in Table 12-3.

The DWQ developed a "Ground Water Quality Protection Strategy" based on an executive order by the governor in 1984. This strategy requires groundwater discharge permits for activities with the potential for pollution. The DWQ has also established classifications for surface water based on beneficial use. To help control water quality, the streams, reservoirs and lakes are assigned standards for maximum contaminant levels according to four major beneficial use designations. These uses are: 1) Drinking water, 2) swimming and indirect contact recreation, 3) stream, lake, and wetland dependent fish and wildlife, and 4) agriculture. Table 12-4 shows the current beneficial use of water quality classes for lakes and storage facilities. Table 12-5 shows the use classification for streams.

In addition to the assigned use classes, some surface waters are designated as High Quality Waters - Category 1. Indian Creek and its tributaries through Newspaper Rock State Park to the headwaters fall in this category.

12.3.3 Federal

Congress passed the federal Water Pollution Control Act in 1972 to establish regulatory programs to improve the quality of the nation's waters. In 1977, the act was amended and became known as the Clean Water Act (CWA). Additional amendments were made in 1987. The CWA amendments provided additional regulations to deal with the growing national toxic water pollutant problem. The act further refined EPA's enforcement priorities and substantially increased the authority to enforce new federal mandates.

In the mid-1950s, the federal government began offering funding programs to state water pollution control agencies to assist in the ongoing construction of wastewater treatment facilities. These early grants provided funding to cover 30 to 55 percent of all construction costs for a given wastewater treatment facility. Federal grants, along with monies provided through the Utah Water Pollution Control Act (UWPCA), funded the construction and expansion of three wastewater treatment facilities in the Southeast Colorado River Basin. Since 1972 federal and state water quality assistance programs have provided over $400,000 and $2.7 million in grants and loans, respectively, for various improvements to treatment facilities owned and operated by the City of Moab, Spanish Valley Water and Sewer Service Agency and the San Juan County Special Service District No. 1.

Although there are no Colorado River Salinity Control Program projects located in the Southeast Colorado River Basin, the McElmo Creek and Paradox Valley projects in Colorado impact waters flowing into and through Utah. On-farm irrigation system improvements are being installed to reduce the salt loading to McElmo Creek, the San Juan River and Colorado River. The Paradox Valley Unit intercepts saline brines before they reach the Dolores River and disposes of them by deep well injection, reducing the salt loading to the Colorado River up to 128,000 tons annually. Other federal agencies also have strong interests

Table 12-3
SUMMARY OF WASTEWATER TREATMENT FACILITIES

Facility	Opening Agency	Treatment Process
Grand		
Moab	City of Moab	Tickling Filter with Primary Clarification and Sludge Digestion
San Juan County		
Blanding	City of Blanding	Facultative Lagoons
Dangling Rope	National Park Service	Total Containment Lagoons
Hall's Crossing	National Park Service	Total Containment Lagoons
Hite Marina	National Park Service	Total Containment Lagoons
Monticello	City of Monticello	Facultative Lagoons
Natural Bridges NM	National Park Service	Total Containment Lagoons
San Juan County SSD No. 1	San Juan County SSD No. 1	Total Containment Lagoons
San Juan Marina		Total Containment Lagoons

Source: State Division of Water Quality data base.

Table 12-4
SURFACE STORAGE CLASSIFICATIONS

Name	Capacity (acre-feet)	Beneficial Use Classes						Trophic Status
		1C	2A	2B	3A	3B	4	
Blanding City No. 4	520	X		X	X		X	46.74
Ken's Lake	2,820			X	X		X	45.01
Loyd's Lake	3,500	X		X	X		X	47.02
Monticello Lake	27			X	X		X	45.46
Recapture Creek	9,319			X	X		X	44.50

Trophic Status Index (TSI) refers to the nutrient status, biological production and morphological characteristics of the water. TSI less than 40 = Oligotrophic, TSI 40 to 50 = Mesotrophic, TSI over 50 = Eutrophic. The lower the number, the better the water.
See Table 12-5 for beneficial use classifications.
Source: Division of Water Quality.

Table 12-5 STREAM CLASSIFICATIONS						
Stream Reach	Use Classification					
San Juan River and tributaries, from Lake Powell to Colorado state line except as listed below.	1C	2B		3B		4
Johnson Creek and tributaries, from confluence with Recapture Creek to headwaters	1C	2B	3A			4
Verdure Creek and tributaries, from highway US-191 crossing to headwaters		2B	3A			4
North Creek and tributaries, from confluence with Montezuma Creek to headwaters	1C	2B	3A			4
South Creek and tributaries, from confluence with Montezuma Creek to headwaters	1C	2B	3A			4
Spring Creek and tributaries, from confluence with Vega Creek to headwaters		2B	3A			4
Montezuma Creek and tributaries, from U.S. Highway 191 to headwaters	1C	2B	3A			4
Colorado River and tributaries from Lake Powell to Colorado state line except as listed separately	1C	2B		3B		4
Indian Creek and tributaries, from confluence with Colorado River to Newspaper Rock State Park		2B		3B		4
Indian Creek and tributaries, through Newspaper Rock State Park to headwaters	1C	2B	3A			4
Kane Canyon Creek and tributaries, from confluence with Colorado River to headwaters		2B			3C	4
Mill Creek and tributaries, from confluence with Colorado River to headwaters		2B	3A			4
Dolores River and tributaries, from confluence with Colorado River to Colorado state line		2B			3C	4
Rock Creek and tributaries, from confluence with Dolores River to headwaters		2B	3A			4
La Sal Creek and tributaries, from Colorado state line to headwaters		2B	3A			4
Lion Canyon Creek and tributaries, from Colorado state line to headwaters		2B	3A			4

Table 12-5 (Continued)
STREAM CLASSIFICATIONS

Stream Reach	Use Classification					
Little Dolores River and tributaries, from confluence with Colorado River to Colorado state line		2B			3C	4
Bitter Creek and tributaries, from confluence with Colorado River to headwaters					3C	4

Class 1	Culinary raw water source
Class 1C	Domestic use with prior treatment
Class 2	Instream recreational use and aesthetics
Class 2A	Primary human contact - swimming
Class 2B	Secondary human contact - boating, wading, etc.
Class 3	Instream use by aquatic wildlife
Class 3A	Habitat maintenance for cold water game fish, water-related wildlife and food chain organisms
Class 3B	Habitat maintenance for warm water game fish, water-related wildlife and food chain organisms
Class 3C	Habitat for non-game fish, water-related wildlife and food chain organisms
Class 3D	Habitat for water fowl, shore birds, water-related wildlife and food chain organisms
Class 4	Agricultural - livestock and irrigation water

Source: Division of Water Quality

and responsibilities concerning the quality of local surface and groundwater supplies. These agencies include the Environmental Protection Agency (EPA), Bureau of Land Management, National Park Service, Forest Service and Bureau of Reclamation. The EPA administers federal water quality law and regulations including the Clean Water Act.

12.4 WATER QUALITY PROBLEMS AND NEEDS

It is important to maintain or improve the water quality as more development and use tend to increase pollution. A major water quality issue is degradation of surface streams due to nonpoint source contaminants. The loss of ground cover within some drainages has increased the concentration of some contaminants and levels of total dissolved-solids in local streams. There is also potential for contamination of critical groundwater aquifers by human waste disposal and by large mining operations. Groundwater is the most difficult to restore once it has been contaminated.

12.4.1 Watershed Water Quality Study

The Division of Water Quality has initiated an intensive monitoring program within the basin. This program is designed to set the benchmarks for further studies which will define sources of pollutants entering rivers and streams. Further studies of chemical and biological loadings will be conducted where water quality parameters exceed state standards. The approach is to determine where the problems are, quantify them, and then develop a systematic approach to improve the water quality deficiencies where possible. In situations where it is impossible to reduce the concentration of certain pollutants to meet established water quality standards, an analysis will be made to evaluate changing the beneficial use classifications to meet the real world use of existing stream and river systems. A summary of findings and the resulting recommendations to control contamination is due in the near future.

Data is available from the latest DWQ report submitted to the Environmental Protection Agency in 1998. Table 12-6 lists the water bodies where the total maximum daily loads (TMDLs) need to be addressed in order to bring them into compliance with current regulations. Water bodies with Utah Pollution Discharge Elimination System discharge permits are also listed. If it is determined that the status of a water body is changed or that it is meeting the designated beneficial uses, then the listing can be changed.

The water quality in the Navajo sandstone aquifer deteriorates as it moves downdip from the recharge areas where it generally contains less than 250 mg/L of dissolved solids.[21] The recharge areas are in Dry Valley and surrounding areas north of Monticello, the headwaters of Cottonwood Wash northwest of Blanding, and the Nokaito Bench south of Bluff. Water in the recharge areas comes from surrounding high mountains. The water quality also changes from a calcium bicarbonate type to sodium chloride type and the dissolved-solids concentration increases.

12.4.2 Moab Uranium Tailings Pile Contamination

There has been concern for some time over groundwater and Colorado River water contamination caused by the uranium tailings pile at the north edge of Moab. This tailings pile containing 10.5 million tons was left by the Atlas Corporation after the Moab uranium mill closure. The pile, which includes much of the dismantled mill, is about 40 feet high and covers about 150 acres. The tailings pile is near the banks of the Colorado River and also covers an area where groundwater outflow from Spanish Valley moves toward the river. A study was commissioned by the federal Department of Energy to determine possible contamination. The Oak Ridge National Laboratory conducted the study in 1997. It was determined about one-half pound of uranium was being leached into the Colorado River every day. Even if the tailings pile were capped, there would still be seepage of nearly four gallons per minute (57,600 gallons per day) into the river. There were also other more serious toxic contaminants getting into the river with ammonia being the most detrimental.

Moab uranium tailings pile

There is concern the contaminants will threaten the existence of the four species of endangered fish. Also, the lower Colorado River water users are concerned the contaminants from the tailings pile will pollute the drinking water supply for millions of people in southern California.

12.4.3 Spanish Valley Groundwater Contamination

The largest unconsolidated aquifer located in Grand and San Juan counties is in the Spanish Valley. Well samples taken had total dissolved-solids concentrations ranging from 154 to 1,820 mg/L. Most of the wells showed total dissolved-solids concentrations less than 1,000 mg/L. Nitrate concentrations were found up to 26 mg/L, over 2.5 times the state water quality standard of 10 mg/L. The nitrate plus nitrite concentrations in the groundwater ranged from

Table 12-6
WATER QUALITY IMPAIRED WATER BODIES

Water Body/ Name	Pollutant or Stress Factor	Priority for TMDL	Target for TMDL (4/2000)
Reservoir			
Blanding City #4	Dissolved oxygen, pH	Low	No
Dark Canyon	Dissolved oxygen	Low	No
Ken's Lake	Temperature, pH	High	Yes
Loyd's Lake	Dissolved oxygen	Low	No
Recapture Creek	Total phosphorus, dissolved oxygen, temperature, pH	Low	No
River/Stream			
San Juan R w/ exceptions	Lead, copper, zinc, total dissolved solids, sediment	Low	No
Montezuma Creek	Dissolved oxygen, lead, zinc, total dissolved solids, sediment	Low	No
Verdure Creek	Total dissolved solids, sediment	Low	No
North Creek	Total dissolved solids, sediment	Low	No
South Creek	Total dissolved solids, sediment	Low	No
Spring Creek	Total dissolved solids, sediment	Low	No
Dolores River & tributaries	Total dissolved solids, iron, ammonia, sediment	Low	No
Water Bodies Needing UPDES Discharge Permit Renewals			
Hatch Wash/ Kane Canyon Creek [a]	Oil and grease, COD, pH, radium 226, total dissolved- solids, total suspended solids, uranium	High	Yes
Montezuma Creek [a]	BOD, fecal coliform, total coliform, pH, suspended solids, total suspended solids	High	Yes

[a] Receiving water not listed as impaired.

Note: A TMDL (total maximum daily load) is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The allowable load must include a margin of safety and allow for seasonal variations.
Source: Utah's 1998 303(d) List of Waters

0.04 to 5.87 mg/L. The nitrate plus nitrite concentrations in the central part of the valley of greater than 3 mg/L could come from human activities, probably the use of septic tanks.

12.4.4 Comb Wash Degradation

The intense grazing practices beginning in the 1880s depleted the native vegetation and allowed increased erosion and down-cutting of the stream channels in many drainages. Deposition was documented in the Comb Wash area during the 1940s and 1950s in many of the valley bottoms. These conditions have allowed a growth of pinyon-juniper covering over 180,000 acres to the point there is little understory vegetation, creating an erosion and wildfire hazard. There has also been an increase in pollutants in streams. Specific trend studies for the Comb Wash grazing allotments can be found in the Comb Wash Watershed Assessment and Soil Survey of San Juan County, 1993.

In addition, the use of the area by recreationists has increased the human waste problem. Samples taken on Comb Wash at the SR-163 bridge have exceeded the state standards for fecal coliform during the period 1978-81 and total coliform standards were exceeded in 1981. No data are available since then.

There were 31 water samples taken during September 1995 of spring water in Road Canyon.[56] Of these, 14 samples with total dissolved-solids of about 1,092 mg/L (1,850 µS/cm) exceeded the state standard. Five samples taken on Arch Canyon at the March Creek mouth had a maximum of 590 mg/L (1,000 micromhos/cm), a minimum of 186 mg/L (316 micromhos/cm) averaging 28.2 mg/L (478 micromhos/cm). At Comb Wash below Fish Creek, samples showed a maximum of 3,540 mg/L (6,000 micromhos/cm), a minimum of 628 mg/L (1,064 micromhos/cm) with an average of 798 mg/L (1,352 micromhos/cm).

In the lower part of the Comb Wash drainage, the suitability for range seeding is poor because of the low precipitation. Seeding can be done in some areas using native plants such as prostrate kochia or wheatgrass. Proper grazing management with scattered water developments can maintain or improve the watershed condition. Use of the area should be restricted to activities that will not contribute to the problems.

12.4.5 Potential Industrial Groundwater Contamination

The region has supported a significant mining industry, especially for uranium ore. The processing of raw ore typically required significant quantities of water and generated large tonnages of spent or processed ore in stockpiles near local processing plants. Contamination of groundwater from the infiltration of process water from lagoons and the infiltration of leachate from spent ore piles are serious concerns. The Division of Water Quality has measured increased concentrations of various contaminants in the regional aquifer around Moab.

Mining tailings pond

Preliminary investigations to assess the movement of water within local aquifers indicate the possible source of contamination to be leachate from local mining lagoons and ore piles. An example is the oil well brine being disposed of in lagoons between Bluff and Montezuma Creek. Water from wells tested in the Bluff area varied in specific conductance from 405 to 780 µS/cm (239 to 460 mg/L) and was of sodium bicarbonate type. In the Aneth area, samples from the Navajo sandstone aquifer showed a median specific conductance of about 3,000 µS/cm (1,770 mg/L).[61] Samples from 56 wells ranged from 145 mg/L to 17,300 mg/L with 17 wells testing less than 1,000 mg/L. This indicates possible contamination as a result of oil development in the Aneth area. Another example is the remains of uranium processing piles such as the one at Moab. See Section 12.4.2 for more detail on the uranium pile near Moab.

12.5 ISSUES AND RECOMMENDATIONS

There are two issues. These discuss septic tanks and mining tailing ponds.

12.5.1 Septic Tank and Drain Field Contamination

Issue - The continued installation of residential septic tanks and drain fields pose a threat to local groundwater aquifers.

Discussion - The more populated areas of the basin are experiencing moderate rates of population growth producing equal rates of domestic waste. The Castle Valley and Spanish Valley areas of the basin have residential developments that are not served by a community sewer disposal system. As a result and with the indicated population growth, domestic septic tank effluent is entering local groundwater aquifers at increasing rates. Areas of high contamination potential should be identified with appropriate limitations placed on future development in these areas. The indicated limitations should be implemented by changes in local zoning ordinances and related city/county planning regulations.

Recommendation - The extent or scope of a potential groundwater contamination problem from individual domestic waste systems should be evaluated by local health districts, the Division of Drinking Water and Division of Water Quality.

12.5.2 Regional Contamination by Mining Tailing Ponds

Issue - The operation of tailing ponds at some local mining operations potentially threaten to contaminate regional groundwater aquifers with heavy metals and other contaminants.

Discussion - The Southeast Colorado River Basin contains relatively large deposits of a number of minerals and petroleum resources subject to heavy mining and processing activity. The most prominent activities are associated with the mining of various precious metals, uranium deposits and the operation of oil and gas fields.

All of the indicated mining activities incorporate tailing ponds as a major element of the overall processing requirement. Most of these ponds are constructed and operated to standards established by either or both, state and federal regulations. However, leakage from local processing or tailings ponds occurs for a number of reasons that typically include substandard construction, installation of faulty liner materials, poor operation, and poor reclamation management of abandoned or shutdown plants.

Materials found in tailing ponds are generally toxic, carcinogenic and subject to strict state and federal drinking water standards. The migration of these contaminants into regional groundwater systems is potentially disastrous to municipal water systems that pump water from these aquifers. Currently, there are over 20 mines in active operation and an estimated 70 mines in various active-inactive states of operation or reclamation. Operations at 5 mines have been suspended due to potential groundwater contamination from onsite processing ponds. These mines are currently subject to groundwater monitoring programs administered by the State Division of Oil Gas and Mining; Division of Water Quality (DWQ); and the federal Nuclear Regulatory Commission (NRC).

The NRC administers permits that regulate the operation of tailing ponds used in the uranium mining and milling industry. Operators of uranium tailing ponds must install and maintain groundwater wells to monitor any potential migration of uranium contaminated leachate to underlying groundwater aquifers.

The DWQ administers permit programs regulating the operation of the remaining mining industries that utilize tailing ponds in the overall milling process. The DWQ administers both NPDES permits for surface water discharge and groundwater contamination permits for all tailing pond installations in the basin.

In recent years, the DWQ has registered concern and disagreement with the NRC's administration of groundwater monitoring programs for uranium tailing ponds within the state. The DWQ feels that current NRC requirements allow for an unacceptable level of probability for major groundwater contamination events. As a result, the DWQ will require the operators of uranium mining and milling plants to meet more stringent state regulations for groundwater contamination in the near future.

Recommendation - The Nuclear Regulatory Commission and Division of Water Quality must continue to aggressively monitor existing groundwater conditions in the immediate area of existing tailing ponds and strictly enforce all NPDES permit requirements associated with the operation of existing mining operations. ❑